**Chapter 10 Test – The Mole**

**True/False** (4 pts each)

1. \_\_\_\_\_\_\_\_ Avogadro’s number is equal to 6.34 x 1026
2. \_\_\_\_\_\_\_\_ Percentage composition shows the actual number of atoms of each element in a molecular compound.
3. \_\_\_\_\_\_\_\_ One mole of any gas occupies a volume of 22.4 L at STP (standard temperature and pressure)
4. \_\_\_\_\_\_\_\_ Atomic mass is defined as the mass of an atom relative to the mass assigned to carbon-12

**Multiple Choice** (4 pts each)

1. \_\_\_\_\_\_\_\_ The mass in grams of 6.02 x 1023 formula units of a substance is called its
   1. molecular volume c. molar mass
   2. molar volume d. atomic mass
2. \_\_\_\_\_\_\_\_ The percentage composition of water is
   1. 67% H, 33% O c. 2 H, 1 O
   2. 11% H, 89% O d. 2 H, 16 O
3. \_\_\_\_\_\_\_\_ The simplest whole number ratio of the atoms of the elements in a compound is given by the
   1. formula mass c. molecular formula
   2. molar mass d. empirical formula
4. \_\_\_\_\_\_\_\_ The molar mass ofMgSO4 is equal to
   1. 72.3 g/mol c. 96.0 g/mol
   2. 24.3 g/mol d. 120.3 g/mol
5. \_\_\_\_\_\_\_\_ Which of the following has the greatest mass?
   1. 3.9 moles sulfur c. 6.1 x 1021 atoms of iron
   2. 9500 formula units of NaCl d. 12.6 g of aluminum nitrate (Al2(NO3)3)
6. \_\_\_\_\_\_\_\_ The sum of the atomic masses in any compound is the compound’s
   1. molecular mass c. empirical mass
   2. formula mass d. molar mass

**Problem Solving** (6 pts each)

**SHOW ALL YOUR WORK! NO WORK = NO CREDIT. YOU WILL EARN PARTIAL CREDIT FOR SHOWING YOUR WORK. REMEMBER TO INCLUDE UNITS IN YOUR ANSWERS!**

1. Calculate the molar mass ofAl2SO4
2. How many moles are in 26.9 g of C12H22O11?(molar mass C12H22O11 = 342 g/mol)  
   G:  
   D:
3. What mass of CO2 gas occupies a volume of 395 Liters at STP? [molar mass CO2 = 44.0 g/mol]  
   G:  
   D:
4. How many molecules are there in a 0.0752 mole sample of CO2?  
   G:  
   D:
5. What volume will 1.21 x 1024 molecules of CBr4 occupy at STP?  
   G:  
   D:
6. What is the percent composition of each of element in potassium chlorate, KClO3?
7. Find the percent composition of a compound that contains 2.3 g of phosphorous, 1.4 g of copper, and 1.3 g of oxygen in a 5.0 g sample.
8. Determine the empirical formula of a compound that contains 36.5% sodium, 25.4% sulfur, and 38.1% oxygen.
9. Find the empirical formula of a compound containing 3.611 g of calcium and 6.398 g of chlorine.
10. Calculate the volume of a balloon filled with 15.0 g of nitrogen dioxide (NO2) gas at STP.  
    G:  
    D: